Cisco 819 Integrated Services Routers

Enabling Machine-to-Machine Applications

The Cisco® 819 Integrated Services Router, part of the Cisco Integrated Services Routers Generation 2 (ISR G2) Family designed in compact hardened and nonhardened form factors, is the smallest Cisco IOS® Software router with support for integrated third-generation (3G) wireless WAN (mobile broadband backhaul). The Cisco 819 ISR machine to machine gateway provides a rapidly deployable, highly available, reliable, and secure solution into machine-to-machine applications for financial, telemetry, utility, retail, industrial automation, and transportation with comprehensive management capability. Transparently integrated into Cisco IOS Software as an enterprise-class feature, the Cisco 819 hardened ISR provides highly secure data, voice, and video communications to stationary and mobile network nodes across wired and wireless links. Figure 1 shows a Cisco 819(H)G Integrated Services Router.

Figure 1. Cisco 819 Integrated Services Router

Available in both nonhardened (Cisco 819G) and hardened (Cisco 819HG) versions (Figures 2 and 3, respectively), the Cisco 819 supporting 3G up to 3.7G wireless WAN (WWAN) speeds offers a cost-effective, rapidly deployable, reliable, and secure primary or backup solution. With support for industrial-grade components, the hardened Cisco 819HG extends the ISR M2M GW footprint and provides the flexibility for deployment in many different stationary and mobile environments where space, heat dissipation, exposure to extreme temperatures, harsher environments, and low power consumption are critical factors. For mobile applications, Mobile IP delivers transparent roaming across multiple wireless networks capable of covering wide geographic areas.

Figure 2. Nonhardened Cisco 819 Integrated Services Router

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Figure 3. Hardened Cisco 819 Integrated Services Router

A critical component of the Cisco Machine-to-Machine architecture, the Cisco 819 serves as the single, horizontal platform that can be used across the entire machine-to-machine market to enhance Cisco's vision of "any device, anywhere, any place" across all industries, including banking, retail, healthcare, manufacturing, government, etc. It also provides the ability to extend Cisco product-based networks to small branch offices with a relatively low incremental investment, as well as to enable managed services offerings based on Cisco architectural offerings.

Product Overview

The Cisco 819 Integrated Services Routers support the latest 3G speeds (High-Speed Packet Access Plus [HSPA+] and Evolution Data Optimized [EV-DO Rev A]), enabling up to 3.7G speeds. They are backward-compatible with High-Speed Packet Access (HSPA), Universal Mobile Telecommunications Service (UMTS), Enhanced Data Rates for Global Evolution (EDGE), General Packet Radio Service (GPRS), and EV-DO Rev 0/1xRTT. The Cisco 819 has two variants:

- Global System for Mobile Communications (GSM) and UMTS models are based on the Third-Generation Partnership Project (3GPP), and they support HSPA+ (High-Speed Uplink Packet Access [HSUPA] and High-Speed Downlink Packet Access [HSDPA]), UMTS, EDGE, and GPRS.
- Code Division Multiple Access (CDMA) models are based on 3GPP2, and they support EV-DO Rev A and Rev 0 and 1xRTT.

In addition to 3G, 3.5G and 3.7G wireless WAN, the Cisco 819 ISRs offer additional WAN options such as Serial and Gigabit Ethernet WAN interfaces and a 4-port 10/100 Fast Ethernet–managed switch for LAN connectivity. The Cisco 819 provides the performance required for concurrent services, including firewall, intrusion prevention, content filtering, and encryption for VPNs; and quality-of-service (QoS) features for optimizing voice and video applications. In addition, Cisco Configuration Professional is a web-based configuration tool that simplifies setup and deployment. Centralized management capabilities give network managers visibility and control of the network configurations at the remote site.

Businesses are looking for ways to reduce costs, increase revenue, and improve business continuity. Third-generation wireless connectivity allows a small enterprise branch office or remote office to set up in a matter of hours, without worrying about availability of broadband services and the need for laying down the lines. Wireless carriers offer flexible, usage-based data plans that can be catered to meet the needs and price points of the business customer. As WAN backup alternatives, 3G and 4G LTE wireless offer greater WAN diversity and resiliency because they are independent of the local terrestrial infrastructure. The Cisco 819 enables businesses to stay productive during service provider downtime or a network failure.

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With enhanced data rates and improved latency (below 100 milliseconds), WWAN services are an ideal way to supplement traditional wireline services. Third- and fourth-generation WWAN data services offered today have average data rates well in excess of ISDN speeds, with theoretical limits in excess of 21 Mbps on the downlink and 5.76 Mbps on the uplink. The 3G and 4G LTE WWAN can be used as a primary link for sites with lower bandwidth requirements and for mobile applications. The 3G and 4G LTE WWAN data services can also be used as a cost-effective alternative in areas where broadband services are either not available or very expensive. Cisco is building on these performance milestones and adding support for wireless to our wide variety of WAN interface alternatives.

Key Business Benefits: Extending the Enterprise to the Small Branch Office

The Cisco 819 is designed to extend the IP network from an enterprise out to a small remote or branch office such as an ATM, kiosk, or mobile infrastructure over a secure, persistent, and reliable connection. Powered by the award-winning Cisco IOS Software, the Cisco 819 supports advanced security features including firewall, intrusion prevention, content filtering, and encryption for VPNs; and QoS features for optimizing voice and video applications in these remote sites, offering end users the experiences and services they have in the enterprise.

Ability to Host Networks in Motion

The Cisco 819 uses standards-based Mobile IP features in Cisco IOS Software to host networks in motion. Transition to different wireless networks is transparent to the users and devices (such as laptops, smart devices, and surveillance cameras), and applications maintain continuous connectivity without the user's manual intervention as WAN links change. In addition to allowing a single node or device to stay connected, the Cisco 819 allows an entire mobile network or subnet to stay connected.

Network Security, Reliability, and Manageability

Cisco IOS Software, which powers the Cisco 819, provides capabilities for network security, manageability, and scalability. It offers integrated network security features, including authorization and authentication, stateful firewall, intrusion detection, and Triple Digital Encryption Standard (3DES) or Advanced Encryption Standard (AES) encryption for VPNs. Support for extensive 3G, 3.5G and 3.7G MIBs and remote-management capabilities gives network managers visibility into and control of devices, including devices connected to the router in these remote sites. Powerful debug and troubleshooting commands allow network managers to quickly isolate network problems and securely make changes to network configurations.

Retail VPN

Retail stores migrating from dialup connections for point-of-sale transactions can use the 3G, 3.5G or 3.7G wireless option on the Cisco 819 for low-cost broadband access with the required security to comply with payment-card-industry and other data security requirements. Multiple devices and applications can then be added to the store network to take advantage of the increased bandwidth and to enable secure mobility and enhance productivity.

Managed Services

Service providers and value-added resellers can use the Cisco 819 as a platform to offer differentiated business-class security and wireless LAN (WLAN) services for small and medium-sized business (SMB) customers. Superior management capabilities such as Simple Network Management Protocol (SNMP) support with 3G MIB and Cisco Configuration Professional make remote management and provisioning easier.

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Primary Features and Benefits

The Cisco 819 ISR is the smallest Cisco IOS Software-based router in both hardened and nonhardened form factors (Figure 4).

Figure 4. Cisco 819 ISR

Table 1 lists the features and benefits of the Cisco 819 Integrated Services Router.

Table 1. Features and Benefits of Cisco 819

Feature	Benefits
Smallest Cisco IOS Software Router in both Hardened and Nonhardened Form Factors	
Single platform for multiple applications	• This single architecture is uniquely designed for deployments in multiple remote applications such as ATM machines, kiosks, small branch offices, remote teleworker sites, gas stations, telemetry, etc. and across all industries. • Support for ruggedization offers the benefit of extending the ISR footprint into deployments wherein the router is exposed to extreme environmental conditions such as heat dissipation, exposure to extreme temperatures, dust, splash water, shock and vibe, etc.
Industrial-grade components	• The router supports extended temperature ranges from –13 to 140ºF (–25 to 60ºC). • The router meets 95 percent of the Non-Condensing Humidity Requirements, IP 41 per IEC 60529 for Vertical Falling Water and Pollution 3 for Dust. The router meets MIL-STD-810, SAEJ1455, and ENG3396 for Shock and Vibe standards. ◦ The router supports a variety of mounting options, including 35-mm din-rail per EN60715, floor mount, and wall mount, allowing for flexibility in deployments. ◦ The router offers both AC and DC* power options.
Lightweight, compact size with low power consumption	The router can be deployed in many different environments where space, heat dissipation, and low power consumption are critical factors.
Increased performance to run concurrent services	Performance allows customers to take advantage of broadband network speeds while running secure, concurrent data, voice, video, and wireless services.
Enhanced security	An integrated stateful and application inspection firewall provides network perimeter security and high-speed IP Security (IPsec); 3DES and AES encryption offer data privacy over the Internet. • Intrusion prevention enforces security policies in a larger enterprise or service provider network. • Content filtering offers category-based URL classification and blocking, thus providing increased productivity and better use of company resources.
Multiple WAN and LAN Connections	
Four-port 10/100-Mbps managed switch	• The Cisco 819 allows for connection of multiple devices in a small office, with the ability to designate a port as the network edge.

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Feature	Benefits
	• VLANs allow for secure segmentation of network resources. • Multiple LAN and WAN devices can be connected to standard 10/100/Ethernet or serial interfaces. • LAN devices can be PCs, video cameras, DVRs, sensors, printers, etc. or an external 4.9-GHz or 802.11a/b/g/n access point.
WAN diversity	Support for multiple WAN links: Gigabit Ethernet, Serial, and 3G provide for business continuity and WAN diversity.
Transparent Roaming Between Wireless Networks	
Dual subscriber-identity-module (SIM) support	Dual SIM provides for high reliability and cellular multihoming support for HSPA-based networks.
Mobile IP features in Cisco IOS Software	• Mobile IP offers transparent roaming for mobile networks, establishing a transparent Internet connection regardless of location or movement. • Mission-critical applications stay connected even when roaming between networks. • Assigned IP addresses to the home network are maintained in private or public networks.
Mobile network features in Cisco IOS Software	These features allow an entire subnet or mobile network to maintain connectivity to the home network while roaming.
Ability to use any type of wireless technology	Users can use the best wireless (3G, 3.5G or 3.7G) technology or network available.
Advanced IP Services in Standards-Based Cisco IOS Software	
Advanced security features	• Authorization and authentication determines who and what devices are allowed to use the network. • Firewall protection provides perimeter security when using public networks. • 3DES and AES encryption provides for highly secure VPNs when transmitting and receiving data over public networks. • Intrusion detection monitors potential malicious activity within the network.
QoS features	• QoS gives traffic precedence to delay-sensitive or prioritized applications. • QoS facilitates low-latency routing of delay-sensitive applications such as streaming video.
IP Multicast	IP Multicast allows efficient broadcast of data or video for increased situational awareness, multiuser communications, or surveillance applications.
Management and manageability	• Network managers can manage and monitor your network remotely with SNMP, Telnet, or HTTP, and locally through a console port. • Support for extensive 3G- and 4G LTE-based MIBs allows for centralized management of these remote devices and gives network managers visibility and control of the network configurations at the remote site. • Network managers can reset to a predesignated golden image and configure through Cisco IOS Software or through an external reset button. • Network managers can upgrade 3G, 3.5G and 3.7G firmware and router configurations remotely and confirm enhancement verification. • Tight integration with Cisco IOS Software allows you to self-monitor the functions of the 3G, 3.5G and 3.7G modems and auto-recover from a failure. • Cisco Configuration Professional provides a web-based tool that simplifies setup and deployment. • Intuitive network management tools such as CiscoWorks for Windows and HP OpenView are supported.

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Product Specifications

Table 2 provides 3G specifications for the Cisco 819 Integrated Services Router.

Table 2. 3G Specifications

Item	Specification
3G modem form factor	Embedded (included with the router)
Important 3G features	• Auto-switch failover between primary and backup link • Multichannel-interface-processor (MIP) profile configuration • CDMA Data Retry • 3G SNMPv2 MIBs and traps • Remotely initiated data callback using voice • Remotely initiated data callback using Short Message Service (SMS) • Remote firmware upgrade over 3G • Virtual diagnostic monitoring • Mobile Equipment Personalization (MEP) lock and unlock capabilities • SIM lock and unlock capabilities
Dual SIM support	 • High reliability and cellular multihoming support for HSPA and HSPA+ based networks • Dual SIM card socket; compliant with ISO-7816-2 (SIM mechanical)
SMS and Global Positioning System (GPS)	 • Ability to send and receive SMS (maximum of 160 characters) • Standalone GPS
MIBs	 • 3G MIB • ENTITY MIB • IF MIB • 3G WWAN MIB persistence
3G network management and diagnostics	• In-band and out-of-band management using Telnet (Cisco IOS Software command-line interface [CLI]) and SNMP, including MIB II and other extensions • Industry-standard 3G diagnostics and monitoring tools (QUALCOMM CDMA Air Interface Tester [CAIT] and Spirent Universal Diagnostic Monitor [UDM])
Modem information	Modem form factor: Embedded Peripheral Component Interconnect (PCI) minicard • 819HG-U and 819G-U: Sierra Wireless MC8795V (non-U.S. market) support HSPA Release 6 • 819HG+7 and 819G+7: Sierra Wireless MC8705 supporting HSPA+ Release 7 • 819HG-S and 819G-S: Sierra Wireless MC5728V • 819HG-V and 819G-V: Sierra Wireless MC5728V • 819HG-B and 819G-B: Sierra Wireless MC5728V
Programming interfaces	Cisco IOS Software CLI

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Item	Specification		
Wireless technologies supported (performance and throughput)	• Part Number: C819(H)G-U-K9 • HSPA: 850, 900, 1900, and 2100 MHz (forward link up to 7.2 Mbps; reverse link up to 5.76 Mbps) • Backward compatibility: ◦ HSDPA: 850, 900, 1900, and 2100 MHz (forward link up to 7.2 Mbps; reverse link up to 384 kbps) ◦ UMTS: 850, 900, 1900, and 2100 MHz (forward link up to 2.0 Mbps; reverse link up to 384 kbps) ◦ EDGE: 850, 900, 1800, and 1900 MHz (forward link up to 236 kbps; reverse link up to 124 kbps) ◦ GPRS: 850, 900, 1800, and 1900 MHz (forward link up to 80 kbps; reverse link up to 42 kbps)	• Part Number: C819(H)G+7-K9 • HSPA+: 850, 900, 1900, and 2100 MHz (forward link up to 21Mbps; reverse link up to 5.76 Mbps) • Backward compatibility: ◦ HSDPA: 850, 900, 1900, and 2100 MHz (forward link up to 21 Mbps; reverse link up to 384 kbps) ◦ UMTS: 850, 900, 1900, and 2100 MHz (forward link up to 2.0 Mbps; reverse link up to 384 kbps) ◦ EDGE: 850, 900, 1800, and 1900 MHz (forward link up to 236 kbps; reverse link up to 124 kbps) ◦ GPRS: 850, 900, 1800, and 1900 MHz	• Part Number: • C819(H)G-x-K9 • • CDMA 1xEV-DO Rev A (forward link up to 3.1 Mbps; reverse link up to 1.8 Mbps) • Backward compatibility: ◦ CDMA 1xEV-DO Rev 0 (forward link up to 2.4 Mbps; reverse link up to 153.6 kbps) ◦ CDMA 1xRTT (forward link up to 153.6 kbps; reverse link up to 153.6 kbps) • x: S = Sprint networks; V = Verizon wireless networks; B = Bharat Sanchar Nigam Limited (BSNL) networks
Frequency bands supported	Part Number: C819(H)G-U-K9 • 850, 900, 1900, and 2100MHz WCDMA bands (HSUPA, HSDPA, and UMTS) • 850, 900, 1800, and 1900 MHz GSM bands (EDGE and GPRS)	Part Number: C819(H)G+7-K9 • 850, 900, 1900, and 2100MHz WCDMA bands (HSUPA, HSDPA, and UMTS) • 850, 900, 1800, and 1900 MHz GSM bands (EDGE and GPRS)	Part Number: C819(H)G-x-K9 • 800 MHz: North American cellular band • 1900 MHz: North American PCS band • x: S = Sprint networks; V = Verizon wireless networks; B = BSNL networks
Included antenna	Two multiband swivel-mount dipole antennae (3G-ANTM1919D)are included with all Cisco 819 Routers.		
LED indicators for 3G	• Received signal strength indication (RSSI) (green) • WWAN (green/amber) • SIM status (green/amber) • 3G service (green/amber) • GPS (green/amber)		
Carrier support	For an updated list of carriers that offer services on the Cisco 819(H)G Series, please visit: http://www.cisco.com/go/m2m.		

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Table 3 lists the software features supported on the Cisco 819 Integrated Services Router.

Table 3. Cisco IOS Software Features on Cisco 819: Advanced IP Features Set (Default)

Feature	Description
Cisco IOS Software requirement	Cisco IOS Software Release 15.1(4)M1 or later
IP and IP services features	• Routing Information Protocol Versions 1 and 2 (RIPv1 and RIPv2) • Generic routing encapsulation (GRE) and multipoint GRE (MGRE) • Cisco Express Forwarding • Standard 802.1d Spanning Tree Protocol • Layer 2 Tunneling Protocol (L2TP) • Layer 2 Tunneling Protocol Version 3 (L2TPv3) • Network Address Translation • Dynamic Host Configuration Protocol (DHCP) server, relay, and client • Dynamic Domain Name System (DNS) • DNS Proxy • DNS Spoofing • Access control lists (ACLs) • IPv4 and IPv6 Multicast • Open Shortest Path First (OSPF) • Border Gateway Protocol (BGP) • Performance Routing (PfR) • Enhanced Interior Gateway Routing Protocol (EIGRP) • Virtual Route Forwarding (VRF) Lite • Next Hop Resolution Protocol (NHRP) • Bidirectional Forwarding Detection (BFD) • Web Cache Communication Protocol (WCCP)
Switch features	• Auto Media Device In/Media Device Cross Over (MDI-MDX) • 8 802.1Q VLANs • MAC filtering • Switched Port Analyzer (SPAN) • Storm control • Smart ports • Secure MAC address • Internet Group Management Protocol Version 3 (IGMPv3) snooping • 802.1x

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Feature	Description
Security features	Secure connectivity: • Secure Sockets Layer (SSL) VPN for secure remote access • Hardware-accelerated DES, 3DES, AES 128, AES 192, and AES 256 • Public-key-infrastructure (PKI) support • 20 IPsec tunnels • Cisco Easy VPN Client and Server • NAT transparency • Dynamic Multipoint VPN (DMVPN) • Tunnel-less Group Encrypted Transport VPN • IPsec stateful failover • VRF-aware IPsec • IPsec over IPv6 • Adaptive control technology • Session Initiation Protocol (SIP) application layer gateway Cisco IOS Firewall: • Zone-Based Policy Firewall • VRF-aware stateful inspection routing firewall • Stateful inspection transparent firewall • Advanced application inspection and control • Secure HTTP (HTTPS), FTP, and Telnet Authentication Proxy • Dynamic and static port security • Firewall stateful failover • VRF-aware firewall Content filtering: • Subscription-based content filtering with Trend Micro • Support for Websense and SmartFilter • Cisco IOS Software black and white lists Integrated threat control: • Intrusion prevention system (IPS) • Control Plane Policing • Flexible Packet Matching • Network foundation protection
QoS features	• Low Latency Queuing (LLQ) • Weighted Fair Queuing (WFQ) • Class-Based WFQ (CBWFQ) • Class-Based Traffic Shaping (CBTS) • Class-Based Traffic Policing (CBTP) • Policy-Based Routing (PBR) • Class-Based QoS MIB • Class of service (CoS)-to-differentiated services code point (DSCP) mapping • Class-Based Weighted Random Early Detection (CBWRED) • Network-Based Application Recognition (NBAR) • Link fragmentation and interleaving (LFI) • Resource Reservation Protocol (RSVP) • Real-Time Transport Protocol (RTP) header compression (cRTP) • Differentiated Services (DiffServ) • QoS preclassify and prefragmentation • Hierarchical QoS (HQoS)

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Feature	Description
Management features	• Cisco Configuration Professional • Cisco Configuration Express • Cisco Configuration Engine support • Cisco AutoInstall • IP service-level agreement (IP SLA) • Cisco IOS Embedded Event Manager (EEM) • CiscoWorks • Cisco Security Manager • Telnet, SNMPv3, SSH, CLI, and HTTP management • RADIUS and TACACS+ • Out-of-band management with external modem through virtual auxiliary port
High-availability features	• Virtual Router Redundancy Protocol (VRRP) (RFC 2338) • Hot Standby Router Protocol (HSRP) • Multigroup HSRP (MHSRP) • Dial backup with external modem through virtual auxiliary port • Dual SIM support for cellular multihoming
Metro Ethernet features	• Ethernet operations, administration, and maintenance (OAM) • Ethernet Local Management Interface (LMI) • IP SLA for Ethernet
IPv6 features	• IPv6 addressing architecture • IPv6 name resolution • IPv6 statistics • IPv6 translation: Transport packets between IPv6-only and IPv4-only endpoints (NAT-PT) • Internet Control Message Protocol Version 6 (ICMPv6) • IPv6 DHCP
Number of recommended users	20

Table 4 lists the system specifications, and Table 5 lists antenna specifications for the Cisco 819 Integrated Services Routers.

Table 4. System Specifications

Feature	Specification
Memory	
Default and maximum DRAM	512 MB
Default and maximum flash memory	256-MB fixed flash memory
Interface Support	
Console or auxiliary port	RJ-45: Single dual-purpose port, which provides direct connection to a console or external modem for management or backup access point
Mini-USB port (RSVD)	Mini-USB port to support remote 3G diagnostics and monitoring tools (QUALCOMM CAIT and Spirent UDM)*
WAN interfaces	• Wireless WAN with 3G, 3.5G and 3.7G speeds • 10/100/1000 Gigabit Ethernet port • Cisco Smart Serial Interface (sync/async/bisync)
LAN interfaces	• Four 10/100 Fast Ethernet ports

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Feature	Specification			
LEDs	• System OK (green/amber) • Activity (green) • WWAN (green/amber) • SIM status (green/amber) • RSSI (green) • 3G service (green/amber) • GPS (green/amber) • Speed and link for Gigabit Ethernet WAN port (green) • Speed and link for all Fast Ethernet LAN ports (green)			
Serial WAN interface	• Support for both synchronous and asynchronous modes • Synchronous maximum speed of up to 8 Mbps • Asynchronous maximum speed of up to 115.2 kbps • Support for bisync modes • Support for network clock synchronization			
Serial protocol support	EIA-232, EIA-449, EIA-530, EIA-530A, V.35, and X.21			
Cisco Smart Serial Cabling	Cisco Smart Serial connectors and supported cables:			
	Product Number	**Cable Type**	**Length**	**Connector Type**
	CAB-SS-V35MT	V.35 DTE	10 ft (3m)	Male
	CAB-SS-V35FC	V.35 DCE	10 ft (3m)	Female
	CAB-SS-232MT	EIA/TIA-232 DTE	10 ft (3m)	Male
	CAB-SS-232FC	EIA/TIA-232 DCE	10 ft (3m)	Female
	CAB-SS-449MT	EIA/TIA-449 DTE	10 ft (3m)	Male
	CAB-SS-449FC	EIA/TIA-449 DCE	10 ft (3m)	Female
	CAB-SS-X21MT	X.21 DTE	10 ft (3m)	Male
	CAB-SS-X21FC	X.21 DCE	10 ft (3m)	Female
	CAB-SS-530MT	EIA/TIA-530 DTE	10 ft (3m)	Male
	CAB-SS-530AMT	EIA/TIA-530A DTE	10 ft (3m)	Male
Physical Characteristics				
Physical dimensions (H x W x D)	Cisco 819G 1.67 x 7.7 x 7.2 in. (42 x 196 x 183 mm)		Cisco 819GH 1.73 x 7.7 x 8.1 in. (44 x 196 x 206 mm)	
Weight	Cisco 819G 2.3 lb (1.0 kg)		Cisco 819GH 3.2 lb (1.5 kg)	
Mean time between failure (MTBF – Ground Benign)	Cisco 819G 400,000 hours		Cisco 819GH 400,000 hours	
Maximum platform power consumption	Cisco 819G 11 watts		Cisco 819GH 11 watts	
Environmental operating range	Cisco 819G 32 to 104℉ (0 to 40℃)		Cisco 819GH –13 to 140℉ (–25 to 60℃)	
Operating altitude	40^0C up to 5000 feet* Above 5000 ft derate maximum operating temperature 1.50C per 1000 feet Maximum altitude: 10,000 ft		60^0C up to 5000 feet* Above 5000 ft derate maximum operating temperature 1.50C per 1000 feet Maximum altitude: 10,000 ft	
Standard safety certifications	• UL 60950-1, 2nd edition • CAN/CSA C22.2 No. 60950-1, 2nd edition • EN 60950-1, 2nd edition • CB to IEC 60950-1, 2nd edition with all group differences and national deviations			
EMC emissions	EN55022/CISPR22, CFR 47 Part 15, ICES003, VCCI-V-3, AS/NZS CISPR22, CNS13438, EN300-386, EN61000-3-2, EN61000-3-3, and EN61000-6-1			
EMC immunity	EN55024/CISPR24, (EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-11), and EN300-386			
Radio Immunity	EN301 489-1, EN 301 489-7, and EN301 489-24			
Cellular radio	EN 301 908-1, EN 301 908-2, EN 301 511, 47 CFR Part 22, and 47 CFR Part 24			

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Feature	Specification
Operating conditions (Cisco 819HG only)	• Noncondensing humidity: 95% • IP 41 per IEC 60529 for Vertical Falling Water • Pollution 3 for Dust Operational Vibration • MIL-STD-810G 2.2.1 Category 4; truck transportation over U.S. highways-restrained cargo • EN61373 functional random vibe - category 1, class B • SAE J1455 operating random vibe cap mounted truck • SAE J1455 Operating Sinusoidal Vibration, Category 3 Nonoperational Vibration • MIL-STD-810G 2.3.9 Category 20 - Ground vehicles • EN61373 simulated non-op long-life vibe - category 1, class B • SAE J1455 Nonoperating Sinusoidal Vibration, Category 3 Operational Shock • MIL-STD-810G 2.2.2 Procedure 1, Functional Shock Nonoperational Shock • MIL-STD-810G 2.2.2 Procedure 5, Crash Hazard • MIL-STD-810G 2.2.2 Procedure 6, Bench Handling • EN61373 non-op shock class B • SAE J1455 4.11.3.1 Handling test
Power specifications	AC Power Adapter • Maximum power consumption: 25W • Meets efficiency Level V • Input voltage and currents supported: 100–264 VAC <0.5A • Maximum output power rating: 20W • For IP 41 need additional enclosure DC Power Adapter* • Maximum power consumption: 26W • Input voltage and currents supported: 10 VDC minimum, 13.8 VDC nominal, 36 VDC maximum operating, and 42 VDC absolute maximum • Maximum output power rating: 20W • IP 41 compliant

*Available Q1CY2012

Table 5. Antenna Specifications

Product	Description
Included antenna	Two multiband swivel-mount dipole antennae are included with all Cisco 819 ISRs
Diversity (dual antennae)	• C819(H)G-U-K9: Diversity supported • C819(H)G-x-K9: Diversity supported
Antenna 3G-ANTM1919D	Description • Multiband swivel-mount dipole antenna • Faceplate mount (two unist included with all Cisco 819 ISRs) Electrical Specifications • Frequency range: 806 to 960 MHz and 1710 to 2170 MHz • Gain: 0 decibels relative to isotropic (dBi) (806 to 960 MHz) and 0 dBi (1710 to 2170 MHz) • Maximum power: 25W • Connector: TNC male • Voltage standing wave ratio (VSWR): <2.5:1 • Nominal impedance: 50 ohms Mechanical Specifications • Antenna dimensions: 7.63 x 0.94 x 0.63 in. (19.37 x 2.34 x 1.59 cm) • Temperature rating: –22 to 158℉ (–30 to 70℃)

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Product	Description
Antenna 3G-ANTM1916-CM	Description • Multiband omnidirectional antenna • Ceiling mount Electrical Specifications • Frequency range: 806 to 960 MHz and 1710 to 2170 MHz • Gain: 1.5 dBi (806 to 960 MHz) and 2.5 dBi (1710 to 2170 MHz) • Maximum power: 50W • Connector: TNC male • VSWR: <1.8:1 (806 to 960 MHz) and <1.6:1 (1710 to 2170 MHz) • Nominal impedance: 50 ohms • Polarization: Vertical • Intermodulation • <–140 decibels relative to carrier (dBc) typical (800 to 960 MHz IM3 at 2 x 20W) • <–140 dBc (1710 to 1880 MHz IM3 at 2 x 20W) • <–150 dBc (1920 to 2170 MHz IM7 at 2 x 20W) Mechanical Specifications • Radome material: White ABS • Base material: Aluminum • Cable: 086FEP conformable • Dimensions (outside diameter [OD] x H): 7.09 x 2.44 in. (18.00 x 6.20 cm) • Weight: 0.62 lb (0.28 kg) • Usable with the following cable extensions: 3G-CAB-ULL-20 and 3G-CAB-ULL-50
Antenna extension 3G-AE015-R	Description • Single-unit antenna extension base (15-ft [457.2-cm] cable included) Electrical Specifications • Frequency range: 0.8 to 5.85 GHz • Attenuation: <3 dB at or below 2.5 GHz • Base connector: TNC female • Pigtail connector: TNC male Mechanical Specifications • Base material: UL 94 V0PC and ABS plastic • Dimensions: 2.8 x 2.4 x 1.8 in. (7.1 x 6.1 x 4.6 cm) • Weight: 6 oz (0.17 kg) • Cable: 15 ft (457.2 cm) non-plenum rated Pro-Flex Plus 195
Antenna extension 3G-AE010-R	Description • Single-unit antenna extension base (10-ft [304.8-cm] cable included) Electrical Specifications • Frequency range: 0.8 to 5.85 GHz • Attenuation: <3 decibels (dB) at or below 2.5 GHz • Base connector: TNC female • Pigtail connector: TNC male Mechanical Specifications • Base material: UL 94 V0PC and ABS plastic • Dimensions: 2.8 x 2.4 x 1.8 in. (7.1 x 6.1 x 4.6 cm) • Weight: 6 oz (0.17 kg) • Cable: 10 ft (304.8 cm) non-plenum rated Pro-Flex Plus 195

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Product	Description
Outdoor antenna 3G-ANTM-OUT-LP	Description • Multiband outdoor low-profile antenna with 15-ft (457-cm) cable • Panel mount (horizontal surface Electrical Specifications • Frequency range: 806 to 960 MHz and 1710 to 2170 MHz • Gain: –1.5 dBi (806 to 960 MHz) and –1.5 dBi (1710 to 2170 MHz), which includes antenna gain and cable loss • Maximum RF power tolerated: 20W • Connector: TNC male, right angle • Cable: LMR-195, 15 ft (457m) • VSWR: <2.5:1 (806 to 960 MHz) and < 2.5:1 (1710 to 2170 MHz) • Nominal impedance: 50 ohms • Polarization: Vertical • Radiation pattern (–3-dB beam width) • Horizontal: Omnidirectional • Vertical: 64 deg (806 to 960 MHz) and 90 deg (1710 to 2170 MHz) Mechanical Specifications • Radome material: Black MakroBlend plastic • Base material: Aluminum • Radome dimensions (OD x H): 5.65 x 2.06 in. (14.35 x 5.23 cm) • Radome weight: 0.375 lb (0.17 kg) • Cable dimensions (L x diameter [D]): 15 ft x 0.195 in. (4.57m x 4.95 mm) • Mounting panel thickness: 0.1 to 0.5 in. (2.54 to 12.7 mm) • Note: All mounting hardware is included. Environmental Specifications • Mechanical impact rating: [IK08] 5 joules per IEC-62262 • Operating and storage temperature: –40 to 185℉ (–40 to 85℃) • Wind rating: 150 mph installed • Water rating: IP65 installed

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Product	Description
Outdoor antenna 3G-ANTM-OUT-COMBO	Includes • Mast- or wall-mount antenna • 3G-ACC-OUT-LA (lightning arrestor) Description • Multiband outdoor omnidirectional antenna • Mast or wall mount • 3G-ACC-OUT-LA lightning arrestor • Note: Can be used with the following cable extensions: 3G-CAB-ULL-20, 3G-CAB-ULL-50, 3G-CAB-LMR240-25, 3G-CAB-LMR240-50, and 3G-CAB-LMR240-75 Electrical Specifications • Frequency range: 806 to 960 MHz and 1710 to 2170 MHz • Gain : +2 dBi (806 to 960 MHz) and +4 dBi (1710 to 2170 MHz) • Maximum RF power tolerated: 20W • Connector: TNC male • VSWR: <2.5:1 (806 to 960 MHz) and <2.5:1 (1710 to 2170 MHz) • Nominal impedance: 50 ohms • Polarization: Vertical • Radiation pattern (–3-dB beam width) • Horizontal: Omnidirectional • Vertical: 40 deg (806 to 960 MHz) and 40 deg (1710 to 2170 MHz) Mechanical Specifications • Radome material: Off-white pultruded fiberglass, UV-protected • Cap material: Off-white MakroBlend plastic • Radome dimensions (OD x H): 1.25 x 16 in. (3.175 x 40.64 cm) • Radome weight: 0.375 lb (0.17 kg) • Mounting hardware • Bracket and clamps (for mast mounting) • Bracket (for wall mounting) • Screws not included (for wall mounting) Environmental Specifications • Operating and storage temperature: –40 to 185℉ (–40 to 85℃) • Wind rating: 100 mph (operational) and 125 mph (survival) • Water rating: IP65 installed

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Product	Description
Outdoor antenna lightning arrestor 3G-ACC-OUT-LA	Description • 3G lightning arrestor for outdoor antennas • Type: Inline quarter-wave arrestor with integrated high-pass filter • Bulkhead mounted and grounded with optional ground lug • Can be used with 3G-ANTM-OUT-COMBO outdoor omni antenna with lightning arrestor • Can be used with the following cable extensions: 3G-CAB-ULL-20, 3G-CAB-ULL-50, 3G-CAB-LMR240-25, 3G-CAB-LMR240-50, and 3G-CAB-LMR240-75 • Indoor (preferred) or outdoor (optional) installation • No maintenance required Electrical Specifications • Frequency range: 800 to 2200 MHz • Maximum insertion loss: 0.2 dB • Maximum RF power tolerated: 20W • Connector: TNC male (protected side) and TNC female (antenna-facing) • VSWR: <1.22:1 (806 to 2200 MHz) • Return Loss: >26 dB • Nominal impedance: 50 ohms • Surge protection: 10 KA single and 5 KA multiple strikes (8/20-microsec test pulse) Mechanical Specifications • Material: Corrosion-resistant brass • Dimensions (OD x L) (approximate): 1.25 x 2.5 in. (3.175 x 6.35 cm) • Mounting hardware • Ground lug (optional grounding method) • Nut for bulkhead mounting and grounding (preferred grounding method) Environmental Specifications • Operating and storage temperature: –40 to 185℉ (–40 to 85℃) • Water rating: IP67 installed

Ordering Information

For Cisco 819 ordering information, please visit the Cisco Ordering Home Page and refer to Table 6.

Table 6. Cisco 819 Integrated Services Router Ordering Information

Product	Description
Cisco 819H Hardened Integrated Services Router Generation 2	
C819HG-U-K9	Compact Hardened 3G IOS Router with GLOBAL HSPA Release 6 based on MC8795V
C819HG-S-K9	Compact Hardened 3G IOS Router with SPRINT EVDO Rev A based on MC5728V
C819HG-V-K9	Compact Hardened 3G IOS Router with VERIZON EVDO Rev A based on MC5728V
C819HG-B-K9	Compact Hardened 3G IOS Router with BSNL EVDO Rev A based on MC5728V
C819HG+7-K9	Compact Hardened 3G IOS Router with GLOBAL HSPA+ Release 7 based on MC8705
Cisco 819 Non-hardened Integrated Services Router Generation 2	
C819G-U-K9	Compact 3G IOS Router with GLOBAL HSPA Release 6 based on MC8795V
C819G-S-K9	Compact 3G IOS Router with SPRINT EVDO Rev A based on MC5728V
C819G-V-K9	Compact 3G IOS Router with VERIZON EVDO Rev A based on MC5728V
C819G-B-K9	Compact 3G IOS Router with BSNL EVDO Rev A based on MC5728V
C819G+7-K9	Compact 3G IOS Router with GLOBAL HSPA+ Release 7 based on MC8705
Power Supplies and Mounting Brackets	
PWR-20W-AC	AC Power Adapter for the Cisco 810 Series ISR
PWR-20W-DC*	DC Power Adapter for the Cisco 810 Series ISR
ACS-810-DM	Desktop Mounting Kit for the Cisco 810 Series ISR

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Product	Description
ACS-810-FWM	Floor Mount and Wall Mount Kit for the Cisco 810 Series ISR
IOS SW and Licenses	
S81UK9-15104M	Cisco 810 Series IOS Universal Data (Default)
S81NPEK9-15104M	Cisco 810 Series IOS Universal Data with No Payload Encryption
SL-810-AIS	Cisco 810 Advanced IP Services License (Default)
SL-810-ADVSEC	Cisco 810 Advanced Security Software License (Default)
SL-810-AIS-NPE	Cisco 810 Advanced IP Services License with No Payload Encryption (Default with NPE IOS Image)
SL-810-ADVSEC-NPE	Cisco 810 Advanced Security Software License with No Payload Encryption (Default with NPE IOS Image)

*PWR-20W-DC available Q1CY2012

For More Information

For more information about the Cisco 819 products, visit http://www.cisco.com/go/m2m or contact your local Cisco account representative.

For more information regarding Cisco 800 Series Integrated Services Routers and options, contact your Cisco representative or go to http://www.cisco.com/go/isr.

Cisco and Partner Services for the Borderless Network Architecture

Enable the Cisco Borderless Network Architecture and the business solutions that run on it with intelligent, personalized services from Cisco and our partners. Backed by deep networking expertise and a broad ecosystem of partners, these services can help you plan, build, and run a network that enables you to expand geographically, embrace new business models, and promote business innovation. Whether you are looking to transition to a Cisco Borderless Network Architecture, solve specific business problems, or improve operational efficiency, we have a service that can help you get the most from your IT environment. For more information, please visit http://www.cisco.com/go/services.

Warranty Coverage and Technical Service Options

The Cisco 819 Integrated Services Router comes with the Cisco 1-year limited hardware warranty. Adding a contract for a technical service offering such as Cisco SMARTnet® Service provides benefits not available with warranty, including access to OS updates, Cisco.com online resources, and Cisco Technical Assistance Center (TAC) support services. Table 7 shows the available technical services.

For information about Cisco warranties, visit http://www.cisco.com/go/warranty.

For information about Cisco Technical Services, visit http://www.cisco.com/go/ts.

Table 7. Cisco Technical Services for Cisco 819 Integrated Services Routers

Technical Services
Cisco SMARTnet Service • Global access to the Cisco TAC 24 hours a day • Unrestricted access to the extensive Cisco.com resources, communities, and tools • Next-business-day, 8 x 5 x 4, 24 x 7 x 4, and 24 x 7 x 2 advance hardware replacement[1] and onsite parts replacement and installation available • Ongoing operating system software updates within the licensed feature set[2] • Proactive diagnostics and real-time alerts on Smart Call Home-enabled devices

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Technical Services
Cisco Smart Foundation Service • Next-business-day advance hardware replacement as available • Business-hours access to SMB Cisco TAC (access levels vary by region) • Access to Cisco.com SMB knowledge base • Online technical resources through Smart Foundation Portal • Operating system software bug fixes and patches

[1]Advance hardware replacement is available in various service-level combinations. For example, 8 x 5 x Next business day (NBD) indicates that shipment will be initiated during the standard 8-hour business day, 5 days a week (the generally accepted business days within the relevant region), with NBD delivery. Where NBD is not available, same-day shipment is provided. Restrictions apply; please review the appropriate service descriptions for details.

[2]Cisco operating system updates include maintenance releases, minor updates, and major updates within the licensed feature set.

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